

Teaching Rowing to School Children: A Pilot Study

Ficarra G¹, Trimarchi F¹, Restuccia R¹, Mannucci C¹, Di Mauro D^{1*}

¹Department of Biomedical and Dental Sciences and Morphological and Functional Sciences, University of Messina, c/o AOU Policlinico G. Martino, Via C. Valeria, Gazzi, 98125, Messina, Italy

1. Abstract

The teaching of sport activities during childhood is fundamental to improve their fitness levels, but also to promote inclusion, sense of responsibility and self-discipline. In many countries physical activity based educational programs include rowing among the disciplines that schools promote and support. In Italy rowing is not included in the common school activities thus we carried out a pilot project in a secondary school in Sicily to evaluate the efficacy of teaching and learning of the basic concepts of rowing technique in school pre-adolescents exposed to rowing for the first time. The 20 seconds maximum speed test was performed with no significant difference between male and female students suggesting that rowing could be easily performed by all school kids to improve not only their physical skills but also their wellbeing.

2. Keywords: Rowing; Adolescents; Coaching; Speed Test.

3. Introduction

Exercise and physical activity are of main importance during the scholar age and adolescence to strengthen personality and for a proper psycho-physic balance, but also to improve the quality of life and the social skills of children [1].

Regular, physical activity is the best antidote to eliminate obesity and maintain an acceptable body weight. It also provides a positive alternative to sedentary activities, in addition children learn the fundamental motor skills that enable them to develop the competence that creates confidence and leads to safe and successful participation in a wide range of sports. Children improve their fitness levels, including muscular and cardiovascular endurance, strength and flexibility, they can learn valuable lessons about accepting responsibility for their personal development leading to greater self-discipline. They learn what means to be cooperative and competitive and to face up to different challenges both as individuals and in groups for developing both leadership and cooperation skills.

To this end rowing has an emerging role among those activities that can be successfully performed by all kind of children, including those with mental or physical disabilities. It is well known that during the scholar age and especially adolescence sport practice

***Corresponding Author:** Prof. Debora Di Mauro, Biomedical and Dental Sciences and Morphological and Functional Sciences, University of Messina, c/o AOU Policlinico G. Martino, Via C. Valeria, Gazzi, 98125, Messina, Italy, Tel: +390902213364, Email: ddimauro@unime.it

Received Date: 26 July 2021; **Accepted Date:** 27 July 2021;

Published Date: 6 August 2021.

is quite important, rowing in particular may be one of those disciplines that are specifically involved in the development of personality and social skills [2]. Despite these beneficial effect, it has also been shown that intense training and an elevated number of competitions during young age might also contribute to psychological distress, burnout and dropping out of sports [3], for this reason team sports are usually preferred to individual sports. In this context, coaches have a fundamental role in terms of providing support, motivation, engagement, and confidence to their athletes, especially at young age [4]. In the Training of Young Athletes Study it has been demonstrated that while parents exerted the strongest influence on the initiation of a sport (either team or individual sport), while coaches were the strongest influence on kids' decision to perform intense training [5], further indicating the importance of specialized coaching activities.

As a matter of fact, rowing is not only an individual sport but can be done in a team and usually training is done in a class setting; in this context rowing can help build social skills because rowers help each other to reach their goals, they experience the meaning of being a crucial part of a team, and they work together to build relationships.

In terms of physical activity rowing has unique features, in fact it allows to exercise all major muscle groups: legs, back and arms are engaged while rowing. In addition, rowing is a low-impact sport that can be afforded by people of various fitness levels and if executed properly, the rowing stroke is a fairly safe motion. It is very unlikely that rowers experience serious injuries as compared to contact and high-impact sports. These are some of the reasons that have led to the inclusion of rowing activities in many schools of the United Kingdom with longstanding positive feedback from either students or their parents. In Italy rowing is not included in the common school activities and very recently the Italian Rowing Federation (FIC) has started a project for school

children and adolescents to promote rowing and its positive values. As part of this objective, we carried out a pilot project at the secondary school "Evemero" (Messina, Italy) to evaluate the efficacy of teaching and learning of the basic concepts of rowing technique in school pre-adolescents exposed to rowing for the first time.

Several observations have reported sex differences in motor learning and performance during growth, with mixed results that may reflect the different variables taken into account. This different ability to learn a new motor skill is related to the development of central nervous system as well as to the presence of sex hormones [6]. Also the instructional approach method provides different timings and pattern of learning, just like feedback (FB) that is one of the most important instructional tactic to improve learning [7]. Verbal feedback is the primary tool used by a coach to help improve a rower's technique and performance, and the ability of FB retention is related to some factors such as memory capacity, attention, concentration and motivation [8]. In fact, it is known that, especially in physical education and coaching [8, 9, 10], part of the information is not retained by the subjects.

In agreement with this, the aim of this pilot project was to evaluate the ability of motor learning and performance in school pre-adolescents exposed to rowing for the first and only time and to assess a possible inclusion of the discipline in the context of curricular activities.

To enable a comparison of the skill development between male and female, we used the 20 seconds maximum speed test and a questionnaire to evaluate the ability to retain the basics of this sport and a physical test using the ergometer to appraise the differences in both gender performances.

4. Subjects and Methods

In this study a total of 62 students of the secondary school "Evemero" (Messina, Italy) have been enrolled. Subjects were both male (36) and female

(26) and only the 19% of female and the 38% of male students was doing some sport. The most popular sports were soccer (30%), basket (17%), swimming (14%), and tennis (11%).

A complete explanation about the rowing technique using the ergometer was provided to the students, using as visual support two ergometers (Concept2, Concept, Italy) and of a rowing single scull boat with a pair of oars. The rowing technique on the ergometer was explained using a prescribing method, the coach provided explanations regarding the types of boats and oars and why is important to train also using an ergometer. The ergometer technique was described while the coach was performing a brief training explaining the importance of the sitting position that has to be firmly hold so that the stroke will be efficient and so that he or she protects the back from injury. The position (angle) of the hips and its effect on the lower back is important to avoid damages to the spine. The hips should be tilted in such a way that the lower back is in 'neutral', that is to say the lumbar vertebrae are slightly concave. The impression on the rower is that they are sitting with the bottom edge of the pelvis balanced on the seat. Then the seat moves forward and backward using the propulsive effect of the legs that push against the foot stretcher, the complete movement includes the so called drive using both arms and the abdomen. During rowing the athlete performs 2 consecutive set of movements, the first is called drive (catch, when ideally the blade of the oar takes the water) and the recovery (finish, when ideally the athlete uses arms to pull the oar outside water). If the movement is performed maintaining a strong position and a correct angle there is no risk of harm to the spine. When the coach ended the practical explanation a 10 question questionnaire with multiple choices (Table 1) and an open question was administered to the students, to evaluate the ability to retain the provided information. Right after the test the students performed a physical test using the ergometer and the performances have been recorded.

Before performing the test each student had a couple of minutes to adjust in the correct sitting position and the movements were explained to avoid inappropriate postures using a verbal feedback approach. When the kid was ready to perform the test he/she was instructed to row at the maximum speed for 20 secs on the ergometer. The distance in meters displayed on the screen of the ergometer at the end of the test was recorded in a file.

Table 1: Questionnaire administered to the enrolled subjects.

Question	Answer 1	Answer 2	Answer 3
What kind of sport is rowing?	Individual-based	Team-based	Both individual and team based sport
Row can be	Even and odd rower	Pair or Double	Without oar
The indoor rowing machine is called	Ergometer	Oar-ergometer	Row-ergometer
For a proper rowing technique is necessary	Trunk rotation	Leg push	Both answers
How many support points has a boat?	1	4	2
Which is the difference between a pair and a double boat?	A double has one oar per rower while a pair boat has 2 oars per rower	Both have 2 oars per rower	A double has 2 oars per rower while a pair boat has one oar per rower
Which are the boat classes in double?	Single sculls, men's pair, men's eight	Single sculls, double sculls, quadruple sculls	Men's pair, men's four, double sculls
Which are the boats with the rudder in the shoe?	Men's (women's) pair, men's (women's) four, quadruple sculls	Single sculls, double sculls, men's eight	Men's pair, men's four, men's eight
What kind of boat a rower uses?	Rowing boat	Kayak	Canoe
How many people are inn a men's eight crew?	8	9	10
How do you feel about this project? Was useful to learn about this sport?	-	-	-
Which class do you attend? Are you a boy or a girl?			

4.1. Statistical Analysis

The obtained data were tested for normality with the Kolmogorov-Smirnoff test and then analyzed with the unpaired T-test, and expressed as means and SEM. The statistical significance was set at $p < 0.05$.

5. Results

5.1. Anthropometric Characteristics

The mean age of recruited subjects was of 13.11 ± 0.10 and 12.93 ± 0.16 years for male and female students, respectively. The mean weight of students was 49.79 ± 1.72 and 46.94 ± 1.94 kg for males and females, respectively. As regarding to height the mean

was 1.55 ± 0.01 and 1.52 ± 0.01 m for males and females, respectively.

The evaluation of heights and weights of the enrolled adolescents showed that boys were significantly taller than girls ($p < 0.01$), but no difference was observed in weights between the two groups.

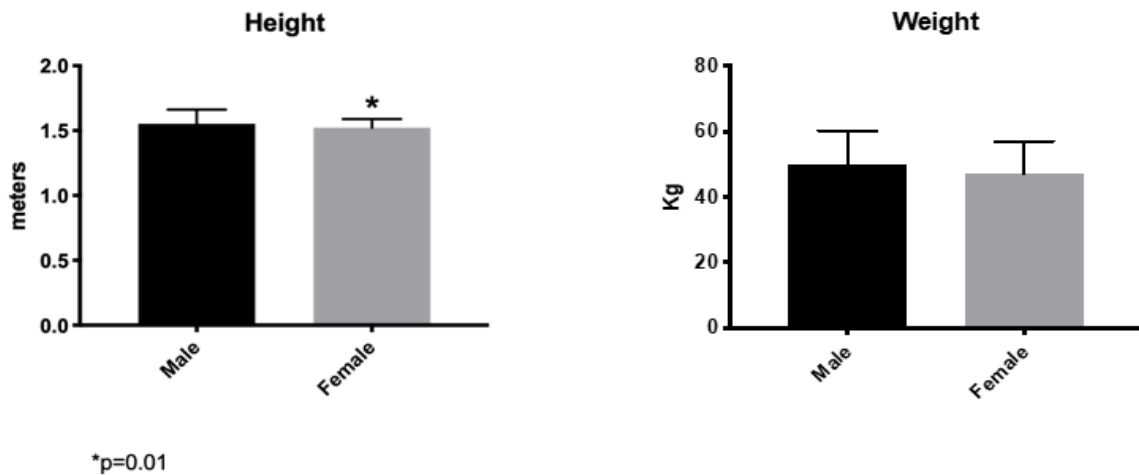


Figure 1

5.2. Efficacy of Teaching and Feedback on the 20 Seconds Test

Despite none of the students was ever exposed to rowing all of them kept a correct sitting position during the test thanks to the verbal feedback provided before starting, also during the test some additional feedback was offered to correct the position of the arms. As a result of the positive reinforcement obtained through verbal feedback all kids performed quite well covering a mean distance of 60 meters. Age matched rowing athletes can cover up to 90 meters when performing the same kind of test.

A further proof of the goodness of the teaching method was provided by the observation that no significant differences on covered meters was recorded between male and female students, suggesting that the known gender differences are not clearly evident in the early pubertal age and do not affect the efficacy of the “drive”.

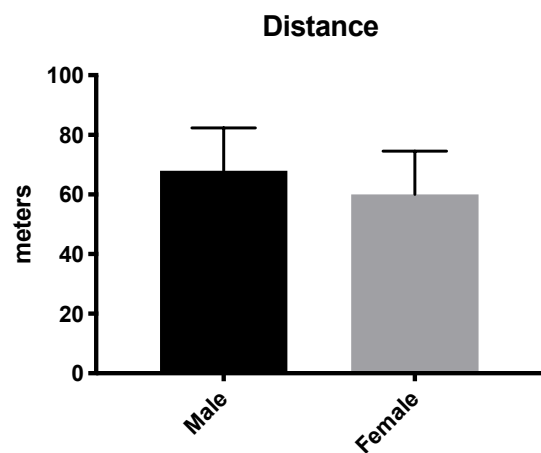


Figure 2

5.3. Evaluation of the Questionnaire

The test to evaluate the ability to retain the information regarding rowing technique has been done before the 20 seconds test, students had 10 minutes to complete all the answers. Analyzing the test to every correct answer was assigned the score of 1 and 0 for the wrong ones, while the open field answer was not included in the evaluation, but used to understand if students appreciated this kind of experience.

No difference was observed between male and female

students that mainly retained all the basics provided.

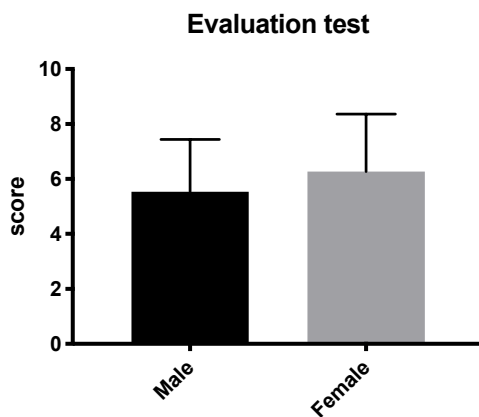


Figure 3

6. Discussion

The results obtained in this study demonstrated a lack in gender differences in terms of physical performance at the ergometer. It has been demonstrated that no differences have been noted for the distance covered (mean values 67.8 and 68.1) between kids that already did some sport and those who did no sport, suggesting that despite the practice could influence some parameters (as endurance), did not change the performance in the maximum speed test. This specific kind of test has been used because is especially important to evaluate the anaerobic effort of an athlete [11], thus this test was the best one also for kids never exposed to rowing before. As a matter of fact, the mean power of 10 maximal strokes may be a critical parameter in traditional rowing performance in elite and amateur rowers, predicting also the output of a 2000 meters competition, as already demonstrated by others [11].

A previous study from Mikulic and coworkers [12] in adolescent rowing athletes with an age span of 12-18 years demonstrated some significant differences between male ($n=297$) and female ($n=193$) since the age of 13 with a peak in the performance at the age of 15. It is possible to speculate that the results differ from the present ones for two main reasons: the number of enrolled subjects and the age span. As a matter of fact with a bigger number of subjects and a wider distribution of ages it is possible to appreciate differences that with small numbers could not be

appreciated. Another difference relies in the kind of test that has been performed, the Wingate test were the subjects perform a 30 seconds maximum speed test, but after a warm-up and this allows to record the peak performance which is an index of fatigue, so this test is a bit different from our test.

In another study [13] the force in watt obtained by male and female rowers was evaluated to understand if there were differences according to the rowing technique. In this study 13 female and 10 male young adults (mean age 25 years) men produced more watts than women, but women had a better hip rotation that allowed to a produce a drive of a similar intensity. Despite the study has been performed on rowers and of a different age it indicates that gender differences could be kept to a minimum if technique is appropriately performed.

The lack of technique of the subjects of the present study might also account for the lack of difference in the results, despite male being significantly taller than female adolescents could be advantaged. As a matter of fact subjects with longer arms and legs could perform a more efficient drive, but this advantage could be a downside if the technique is poorly performed [14].

Recently several studies have addressed the role of physical activity in adolescent for health promotion, including studies focusing on the improvement and evaluation of specific school-based intervention strategies. Although school-based interventions are considered the most practicable and applicable way to avoid low physical activity levels, there is no agreement about optimal intervention strategies [15]. Physical education at school should focus on improving the enthusiasm of children and adolescents in performing sports and physical activity throughout their adult life [16], to make them more skilled and to empower them, especially girls. Physical activity is considered as the vehicle through which students improve knowledge, skills, and attitudes to lead healthy lifestyles, in this regards coaches have both

instructional and motivational tasks which are fundamental to enhance skill acquisition. Outdoor physical activity based interventions during leisure time that generate fun, enjoyment and interest are aimed at fostering the use of self-regulation skills to promote and increase regular physical activity of students outside school [17]. Rowing is one of the sports that better conjugate the pleasure of an outdoor activity with the educational concepts, as the enjoyment and respect for the environment; and provides an atmosphere that encourages adolescents to engage in physical activity. Moreover rowing is well accepted and largely performed also by girls that usually show less engagement in physical activity as compared to boys, due to psychosocial factors. Indeed a recent paper demonstrated a steady decrease in the sex difference across years in collegiate rowing, which was paralleled by an increase in participation of the women relative to the men in collegiate rowing [18].

In conclusion this study does not provide proof of gender differences in the analyzed subjects suggesting that rowing could be easily performed by school kids to improve not only their physical skills but also their wellbeing.

Declarations

Funding

No funding was received to perform this study

Conflict of interest

The authors have no conflict of interest

Availability of Data

The authors have the original data set on file

Authors' Contributions

Conceptualization and writing: GF, DDM.

Data acquisition and analysis: GF, RR, CM.

Critical revision: FT, DDM.

Ethics Approval

Not required

Consent to Participate

All children's parents have signed an informed consent which is recorded on file.

7. References

1. [Donnelly JE and Lambourne K. Classroom-based physical activity, cognition, and academic achievement. *Prev Med.* 2011; 52: S36-S42.](#)
2. [Bessa C, Hastie, P, Araújo R and Mesquita I. What Do We Know About the Development of Personal and Social Skills within the Sport Education Model: A Systematic Review. *J Sports Sci Med.* 2019; 18: 812-829.](#)
3. [Wall M and Côté J. Developmental activities that lead to dropout and investment in sport. *Phys Educ Sport Pedagogy.* 2007; 12: 77-87.](#)
4. [Hill G, and Simons, J. A study of the sport specialization on high school athletics. *J Sport Soc Issues* 1989; 13: 1-13.](#)
5. [Baxter-Jones AD, Maffulli N and TOYA Study Group. Parental influence on sport participation in elite young athletes. *J Sports Med Phys Fitness* 2003; 43: 250-255.](#)
6. [Deaner RO, Lombardo MP and Balish MS. Sex Differences in Sports Interest and Motivation: An Evolutionary Perspective. *Evol Behav Sci* 2016; 10: 73-97.](#)
7. [Murillo Pardo B, García Bengoechea E, Generelo Lanaspá E, Bush PL, Zaragoza Casterad J, et al. Promising school-based strategies and intervention guidelines to increase physical activity of adolescents. *Health Educ Res.* 2013; 28: 523-538.](#)
8. [Mesquita I, Rosado A, Januário N and Barroja E. Athlete's Retention of a Coach's Instruction Before a Judo Competition. *J Sport Sci Med.* 2008; 7: 402-407.](#)
9. [Januário N, Rosado A, Mesquita I, Gallego J, Aguilar-Parra JM. Determinants of feedback retention in soccer players. *J Hum Kinet.* 2016; 51: 235-241.](#)
10. [Rosado A, Mesquita I, Breia E and Januário N. Athlete's Retention of Coach's Instruction on Task Presentation and Feedback. *Int J Perform Anal Sport.* 2008; 8: 19-30.](#)

11. [Cataldo A, Cerasola D, Russo G, Zangla D and Traina M. Mean power during 20 sec all-out test to predict 2000 m rowing ergometer performance in national level young rowers. J Sports Med Phys Fitness 2015; 55: 872-877.](#)
12. [Mikulic P and Markovic G. Age- and gender-associated variation in maximal-intensity exercise performance in adolescent rowers. Int J Sport Med. 2011; 32: 373-378.](#)
13. [McGregor AH, Patankar ZS and Bull AMJ. Do men and women row differently? a spinal kinematic and force perspective. Proc Inst Mech Eng P J Sport Eng. 2008; 222: 77-83.](#)
14. Molea V, Zangla D and Benecchi A. I fondamenti del canottaggio italiano. Federazione Italiana Canottaggio. 2014.
15. [Kriemler S, Meyer U, Martin E, van Sluijs, EM, Andersen, LB, and Martin BW. Effect of school-based interventions on physical activity and fitness in children and adolescents: a review of reviews and systematic update. Br J Sports Med. 2011; 45: 923-930.](#)
16. [Kahn EB, Ramsey LT, Brownson RC, Heath GW, Howze EH, Powell KE, et al. The effectiveness of interventions to increase physical activity. A systematic review. Am J Prev Med. 2002; 22: 73-107.](#)
17. [Haug E, Torsheim T, Sallis JF and Samdal O. The characteristics of the outdoor school environment associated with physical activity. Health Educ Res. 2010; 25: 248-256.](#)
18. [Keenan KG, Senefeld JW, and Hunter SK. Girls in the boat: Sex differences in rowing performance and participation. PLoS One 2018; 13: e0191504.](#)

Citation: Giovanni Ficarra et al. Teaching Rowing to School Children: A Pilot Study. SunKrist Sports Med Res J. 2021; 2: 1003.

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